

<b>I. APPLICANT ORGANIZATION</b> (name and address with zip) Experimental Television Center Ltd. 164 Court Street Binghamton, NY 13901	<b>PROJECT GRANT APPLICATION</b> <b>NATIONAL ENDOWMENT FOR THE ARTS</b> WASHINGTON, D. C. 20506																																	
<b>II. PROGRAM UNDER WHICH SUPPORT IS REQUESTED</b> Major Media Centers	<b>III. PERIOD OF SUPPORT REQUESTED</b> <div style="display: flex; justify-content: space-between;"> <div>           START <u>1/1/78</u>            MONTH DAY YEAR         </div> <div>           END <u>1/1/79</u>            MONTH DAY YEAR         </div> </div>																																	
<b>IV. SUMMARY OF PROJECT DESCRIPTION (COMPLETE IN SPACE PROVIDED. DO NOT CONTINUE ON ADDITIONAL PAGES.)</b> <p>The increased availability and utilization of microprocessor technology requires an intensive research effort into hardware and software design to insure the usefulness of these systems in the arts and humanities. The Experimental Television Center and the Vasulkas have been cooperating since 1976 on a project supported by the NEA and the NYSCA which has made progress in the interface of a minicomputer to video systems. The systems designed are flexible, versatile, low in cost and relatively easy to operate. Modular design permits expansion without altering the fundamental design of the system. Software allows precise control over image and sound elements as well as frame structures and sequences and is responsive to individual requirements; interactive language allows the user to direct the processor in a language which directly relates to basic visual and sound elements and their organization in time. The present proposal extends this primary research along three defined lines. Hardware: The hardware will be stabilized at a fixed developmental point, solidifying prototyped designs and interfacing to a smaller format computer. Software: Hardware stabilization will allow the necessary time for further programming development in both analytic and synthetic modes for the production of tapes by a number of invited artists at the Center. Information Distribution: In order to serve the needs of individuals and organizations working in this area, all results of this two year period of research, including complete schematics, programming information and more theoretical papers, will be published. The attachments provide detailed information concerning each aspect of this project, an indication of audience served and biographies of participants.</p>																																		
<b>V. ESTIMATED NUMBER OF PERSONS EXPECTED TO BENEFIT FROM THIS PROJECT</b> several hundred directly																																		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left;">VI. SUMMARY OF ESTIMATED COSTS (RECAPITULATION OF BUDGET ITEMS ON PAGES 2 AND 3)</th> <th style="text-align: right;">TOTAL COSTS OF PROJECT (rounded to nearest ten dollars)</th> </tr> <tr> <td colspan="2"><b>A. DIRECT COSTS</b></td> <td></td> </tr> <tr> <td style="width: 30%;">SALARIES &amp; WAGES</td> <td style="width: 40%;"></td> <td style="text-align: right;">\$ 56,720</td> </tr> <tr> <td>FRINGE BENEFITS</td> <td></td> <td></td> </tr> <tr> <td>SUPPLIES &amp; MATERIALS</td> <td></td> <td style="text-align: right;">8,000</td> </tr> <tr> <td>TRAVEL</td> <td></td> <td style="text-align: right;">1,500</td> </tr> <tr> <td>SPECIAL</td> <td></td> <td></td> </tr> <tr> <td>OTHER</td> <td></td> <td style="text-align: right;">10,000</td> </tr> <tr> <td colspan="2" style="text-align: right;"><b>TOTAL DIRECT COSTS</b></td> <td style="text-align: right;">\$</td> </tr> <tr> <td colspan="2"><b>B. INDIRECT COSTS</b></td> <td></td> </tr> <tr> <td colspan="2" style="text-align: right;"><b>TOTAL PROJECT COSTS</b></td> <td style="text-align: right;">\$ 76,220</td> </tr> </table>		VI. SUMMARY OF ESTIMATED COSTS (RECAPITULATION OF BUDGET ITEMS ON PAGES 2 AND 3)		TOTAL COSTS OF PROJECT (rounded to nearest ten dollars)	<b>A. DIRECT COSTS</b>			SALARIES & WAGES		\$ 56,720	FRINGE BENEFITS			SUPPLIES & MATERIALS		8,000	TRAVEL		1,500	SPECIAL			OTHER		10,000	<b>TOTAL DIRECT COSTS</b>		\$	<b>B. INDIRECT COSTS</b>			<b>TOTAL PROJECT COSTS</b>		\$ 76,220
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**EXPERIMENTAL TELEVISION CENTER LTD.**  
**164 COURT ST.**  
**BINGHAMTON NEW YORK 13901**  
**607-723-9509**

I

Project Summary

Hardware:

The present microprocessor systems are based on an LSI-11 minicomputer interfaced to a variety of video synthesizing devices. When operated as a generating device, no external video inputs are employed; when operated as a processing type, the computer controls a variety of image collecting and processing components such as cameras, keyers, colorizers and sequencers. Each composition may be scored, programmed, edited and finally recorded by the artist. As has been noted, the present computer is a 16 bit system; research is already underway to explore the possibility of interfacing an 8 bit microprocessor using the same modules as the larger system. The complete integration of the 8 and 16 bit microprocessors will expand the possible applications of the entire system. Although less powerful, the 8 bit system is less costly and more widely accessible to educational and cultural organizations as well as to individuals. A basic system as well as a number of additional card capabilities are commercially available. The growth of individual ownership by artists and others of smaller systems indicates the necessity of taking these systems into consideration in the design of a larger system. With the integration of the 8 bit and the 16 bit systems, individuals and organizations with access only to a smaller system may still fully utilize the designs and benefit from the research presently being conducted. A wider audience can be served by this system than by a system oriented to a single format. In addition, artists utilizing the full system at the Center in the production of videotapes may easily interface personal 8 bit systems or develop programming at the Center to be used on smaller systems available at the home institution. The integrated system will also permit greater participation in software, programming and design exchanges among artists and organizations.

The primary aim of the hardware section of this proposal is to stabilize the development of the computer based video systems at a fixed point; although the system has been designed and constructed in such a manner that continued development is possible, this project defines specific parameters of the systems in order that more time may be devoted to software developments and development and distribution of information concerning the research. The processing components of the system have already been designed and constructed and are operational; components necessary for the generating capability have been prototyped, and the interface with the 8 bit system has been partially explored. The hardware aspect of the project concentrates on the synchronization of the systems, on finalizing of designs for the prototyped sections and on insuring that the two systems are identical. This process is critical to the development and exchange of software between the two major systems in Binghamton and Buffalo and among a wide group of artists; publication must include a comprehensive set of designs and schematics which have been fully tested and implemented.

Software:

The software section of the project will emphasize the continued development of a language and programming system which does not require a knowledge of machine languages for use of the system. Interactive language allows the artist to use words and concepts derived from the arts to command the computer in the structuring of images, sounds and sequences. Two approaches to programming will be explored simultaneously; the holistic or synthetic avenue will permit the operation of the system in a total compositional mode while the analytic programming avenue will concentrate on the development of utility programs for each specific module to allow the artist to identify the parameters of each particular image generating or processing module. This project will also include an initial exploration of the development of a language of visual images and image making and processing tools; a synthetic form incorporating the languages of computer sciences and the arts concerns itself with the functions and products of electronic tools and systems, the identification and definition of basic image and sound structures and their spatial and temporal organization. The software development may assist in the initial development of this language.

Information Distribution:

Access to the information resulting from this research project is important to individuals working in the arts, sciences and humanities. The dissemination of both hardware and software information is the third aspect of this project. One important component of this dissemination is the publication of information which has resulted from the research conducted in 1976-77 and the proposed research. Included will be technical data and software reflecting the stabilized system, schematics and programming as well as theoretical papers. In order to reach as broad an audience as possible two avenues of dissemination will be pursued; the independent publishing effort will be supplemented with the utilization of already established publications dealing with the arts or technology. In order to reach those individuals and institutions which are already working in the area of microprocessor research, are utilizing or contemplating the use of such systems, we propose to establish contacts at the outset of the project, outlining the proposed research, assessing and evaluating particular areas of interest and need. Organizations which are currently involved in this field include the Chicago Art Institute, Massachusetts Institute of Technology, State University of New York at Buffalo, Binghamton and Albany, educational stations such as WGBH and independent educational production and exhibition centers such as Media Study/Buffalo, Synapse in Syracuse and White Ox Films in Rochester. Individuals include Dan Sandine, Tom Defanti, Phil Morton, Bob Schneider, Joseph and Patsy Scala, Tom DeWitt, Joel Chadabe, Bill and Louise Etra, Gary Hill, David Jones, Steven Beck, Bill Hearn, Nam June Paik, Stan Vanderbeek and Hollis Frampton.

Workshops and participation in conferences will be another component of information dissemination. This will be done as requested and the cost to the requesting agency will follow the fee schedule already established at the Center for workshops of this nature.

Artists who were contacted in the initial stage of the project will be invited to visit the Center to explore the system. Approximately ten artists can participate in the production aspect of the project by using the system at the Center on an individual basis for a maximum of seven days. Resulting tapes would be available at the Center's library and could be made available as a group show to interested arts and educational institutions.



### Implications

The most fundamental philosophical aspect of this project concerns the pure research into the development of technologically sophisticated systems with great creative potential, systems of direct use to artists and systems which explore the parameters of the interface of the sciences and the arts. Microprocessor systems have practical applications in a wide variety of art forms, particularly in the areas of cinema, including film and video, still photography, graphics, design and music. They can be used as support systems in the performing arts, for control over lighting and sound mixing devices for example. The proposed system can serve as a model for the development of inexpensive control systems for non-commercial educational television and video production centers. The system is valuable as a teaching and modeling tool; it becomes an inherent component of the research, useful as a device for the formulation and modification of concepts rather than for visual illustration.

The microprocessor research and resulting publications are not limited to one particular format which allows individuals and organizations with a variety of systems configurations, interests and needs to participate and benefit. The versatility of the system provides for applications in the arts, sciences and education.

### Organizational Considerations

The Experimental Television Center will provide coordinating services, although primary hardware and software research will occur in both Binghamton and Buffalo in order to take full advantage of both human and systems resources in both locations. Binghamton will coordinate the results of the primary investigations, to eliminate duplication of effort and insure the compatibility of the systems. As the research is completed, hardware will be constructed in Binghamton; completed documentation on all aspects of the research, theoretical and practical, will be maintained at the Center in order that information collection and distribution is efficient and effective. The system in Binghamton will be available to artists for research and production purposes. Resulting materials will be organized and prepared for distribution. Attachment II outlines the organizational structure and participants in the project; attachment III provides biographical materials.

### Context of Project and Summary of Past Activities

Attachment IV, a paper entitled 'A Computer Based Video Synthesizer System', was delivered by Dr. Donald McArthur at the Design/Electronic Arts conference held in Buffalo in March 1977. This paper was a direct outgrowth of the research project supported by the NEA and the NYSCA in 1976-77 and explains in detail the results of the hardware research conducted in Binghamton and Buffalo. In addition a summary paper submitted to the NEA is attached (V), providing supplementary background materials. The report concerning software development is in the final stages of preparation and will be forwarded by August. All technical data, including a complete set of schematics for all components of the systems developed in both locations is being collected in Binghamton in preparation for publication. This information will form the core of the publication resulting from this project; the publication will include all hardware revisions to the prototyped designs and the integration of the 8 and 16 bit systems.

In the twelve months of this original project all of the processing components

of the system were completed. Generating components which were not included in the original proposal were prototyped in Buffalo; the proposed project involves the modification to these prototyped designs and their final construction. Design of the 8 bit interface is currently being explored in Buffalo and Binghamton; the proposed project includes the prototyping and final design and construction of the interface. Several software programs have been developed; videotapes produced on the system are available. Because the majority of the twelve month period necessarily had to be devoted to hardware design and construction, the emphasis of the proposed project would be on achieving hardware stability and compatibility so that research on software aspects could be more intensive. Hardware stability is also necessary so that extensive research can be conducted on the use of the computer systems by artists. The system at the Center will be operational by Fall 1977 and available for use by artists at that time.

With the increasing interest in the development of video image processing tools and systems and in the uses of microprocessors in the arts, the establishment of a program to encourage research and development in these areas and to support the collection and dissemination of information generated by such research is possible; this proposed project will serve partially as a feasibility study for the development of such a program. Several other proposals are being submitted to other agencies in this effort.

## Attachment II

### Directors

Ralph Hocking:	administrative director responsible for policy
Steina Vasulka:	co-directors responsible for developmental
Woody Vasulka:	directions for hardware and software, theoretical research and evaluation of systems

### Associate Director: Hardware

Dr. Donald McArthur	responsible for hardware design and systems testing and analysis
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### Associate Director: Software

Walter Wright	responsible for software development and programming
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### Engineering and Design Assistants

Jeffrey Schier	responsible for assisting in hardware design in consultation with McArthur and Wright and documentation of system
Richard Brewster	responsible for hardware construction in consultation with McArthur and Wright and documentation of system

### Project Coordinator

Sherry Miller	liason person responsible for communication among all participants, organizational aspects of information collection and distribution, grant research and writing and administrative assistance
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### Equipment Coordinator

	responsible for the organizational aspects of workshops, equipment scheduling and assistance to artists
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### Temporary Help

	part time assistance with hardware construction and publication
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### Clerical

	part time assistance with written communication and publication
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Under NEA grant #A-17020-77, awarded to the Experimental Television Center, Ltd., we have accomplished preliminary work for two complementary books on the craft of experimental video.

By now, the scope of this project requires us to request additional funding to complete writing, diagramming the tools and systems, reproducing images from/of these tools and systems, and designing the two volumes.

Volume I is a consideration of video concepts, processes and techniques, including a survey of the development and utilization of innovative tools. Volume II, predominantly visual, will detail conventional and unconventional processes in standard facilities as well as innovative tools currently available to artists.

In the course of researching these volumes, we have assembled what we believe to ~~be~~ be the most extensive archive of print materials relating to experimental video. Materials include,

1) Transcribed and/or notated interviews with Steve Beck, George Brown, Tom Dewitt, Bill Etra, Lee Felsenstein, John Godfrey, William Gwin, Bill Hearn, Philip Perlman, Earl Reiback, Steve Rutt, Dan Sandin, Gerd Stern, Rudi Stern, Skip Sweeney, Sid Washer, Howard Wise and others.

2) Assembled documentation of the Rutt/Etra; the Sandin Image Processor; the Hearn Vidium, Videolab and Model 200 colorizer; the Templeton mixer/colorizer/quantizer; the Paik/Abe synthesizer; ~~the~~ Wobulator; the Brown A/B sequencer, priority encoder, 8-level digital colorizer, H-drift clock, C.T. Lui colorizer; the Siegel colorizer; the <sup>Mackin</sup> Videola the Dewitt Pantomation System and Design Device; the Spectre; the Movicolor; the Washer "Albatross"; the Dave Jones colorizer.

3) Collected roughly 3,500 pages of information relating to the development of tools, funding of early centers, published and unpublished critical writings.

4) Prepared the first chapter and mock-up of two volumes on the craft of experimental video.

These volumes will accomplish two objectives:

1) Instructional, in which the imaging possibilities of both conventional facilities and innovative tools are presented thoroughly and progressively as an aid to practitioners in the medium. One ~~linguistic~~ part of this is linguistic, the presentation of a precise and consistent vocabulary of terms to describe processes, techniques and effects.

2) Archival and critical, in which tools, processes, techniques and effects will be assembled and analysed, so that the volumes will be a major resource for future historians and critics of the medium. It should be stated that such a resource does not now exist.

It is our objective that this project give artists a greater technical self-sufficiency so as to permit the most creative realization of the medium's potential. It is only when artists possess both hardware and conceptual tools that video can realize its promise.

Upon completion of this project, the two volumes will be published simultaneously by \_\_\_\_\_ and archival materials deposited at \_\_\_\_\_.